BEFORE THE

OHIO ENVIRONMENTAL PROTECTION AGENCY

In the Matter of	:	
	:	
Rockwell International	:	
Corporation	:	DIRECTOR'S FINAL
On-Highway Products	:	FINDINGS & ORDERS
Hebron Road	:	
Heath, Ohio 43056	:	
	:	
Ohio Revised Code Sections	:	
6111.03(H), 3734.13(A),	:	
3734.20(B), 3745.01	:	

ADMINISTRATIVE ORDER ON CONSENT

I. JURISDICTION

This Administrative Order on Consent (Consent Order) is issued pursuant to the authority vested in the Director of the Ohio Environmental Protection Agency (OEPA) by Ohio Revised Code (ORC) Sections 3734.13(A), 3734.20(B), 6111.03(H), and 3745.01.

II. STATEMENT OF PURPOSE

In entering into this Consent Order, the mutual objectives of Ohio EPA and Respondent are (1) to complete a full investigation of the Operable Units, as described in paragraph III. G. below, (2) to determine the extent of contamination at the Site caused by the release of hazardous, industrial and/or other waste from the operable units, and (3) to develop and evaluate a program of appropriate remedial measures, if any, employing sound scientific, engineering and construction practices which shall be consistent with federal, state and local law.

Neither this Consent Order nor the performance of any act hereunder by Respondent shall constitute an admission of law or fact or evidence of the same, nor or any violation of any federal, state or local law, statute, regulation or ordinance.

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operates a manufacturing facility on Hebron Road, Heath, Ohio.

B. The facility began operations in 1951 and has been known as Ohio Spring and Axle, Rockwell Standard, North American Rockwell and Rockwell International.

C. Four unlined lagoons were constructed at the east end of the facility beginning in 1951. These lagoons accepted wastewater for percolation and evaporation. The lagoons were closed in 1987 with the knowledge of Ohio EPA. The wastewaters disposed of in the lagoons contaminated the ground water in and around the facility.

D. The possibility of ground water contamination was first studied in 1981. A hydrogeologic study conducted in 1986 further refined the data of contamination. Quarterly monitoring of the ground water during 1989 indicates continued contamination.

E. The ground water contaminants are hazardous wastes as defined in Article III, and/or industrial wastes and/or other wastes, as those terms are defined in Ohio Revised Code 6111.01. The discharge, deposit, injection, dumping, leaking, spilling, or placing of hazardous waste, industrial waste or other wastes into or on surface and ground waters constitutes pollution of the "waters of the State" as that term is defined at ORC Section 6111.01(H) and is prohibited by ORC Section 6111.04.

F. The Site is a "Facility" as that term is defined in ORC 3734.01(N), where hazardous wastes were treated, stored or disposed. Respondent is the owner or operator of the facility. Conditions at the Site constitute a substantial threat to public health or safety or are causing or contributing to or threatening to cause or contribute to water pollution or soil contamination.

G. Respondent is the owner or operator of the facility, or the person

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who placed, or caused to be placed, industrial or other wastes at the facility at Hebron Road, in violation of ORC Section 6111.04.

H. The actions to be taken pursuant to this Consent Order are reasonable and necessary to protect the public health or welfare or the environment, and the Director believes the issuance of these Orders is furthering the intent of the General Assembly, that the Environmental Protection Agency will prevent and abate pollution of the environment for the health, safety, welfare, and property of the people of the state.

I. The Director has given consideration to and based his determination on, evidence relating to the technical feasibility and economic reasonableness of complying with these Orders and to evidence relating to conditions calculated to result from compliance with these orders, and its relation to the benefits to the people of the State to be derived from such compliance in accomplishing the purpose of Chapters 3734. and 6111. of the Ohio Revised Code.

J. A reasonable time for beginning and completing the actions required by this Consent Order has been provided herein.

K. Subject to the terms and conditions hereof and applicable laws, Respondent has agreed to undertake the actions in this Consent Order.

V. COMMITMENT OF RESPONDENT

A. Respondent consents to and will not challenge OEPA's jurisdiction to enter and enforce this Consent Order, and, subject to the terms and conditions hereof and applicable laws, does hereby agree to undertake, at its expense, all actions required by the terms and conditions of this Consent Order within the time frames specified

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herein, except as the provisions of Articles XIX and XIII are deemed to apply to the time for performance.

B. Respondent shall assume any and all liability arising from or relating to its acts or omissions in the performance of the work or its failure to perform fully or complete the work under this Consent Order.

VI. PARTIES BOUND

A. This Consent Order shall apply to and be binding upon Respondent and OEPA, their officers and directors in their capacity as such, successors and assigns, and upon all persons, contractors, and consultants acting on behalf of or in concert with OEPA or Respondent.

B. Respondent shall provide a copy of this Consent Order to all contractors, subcontractors, laboratories, and consultants retained to conduct the work or any portion of the work to be performed pursuant to this Consent Order prior to their individual participation on Respondent's behalf and shall direct and use its best efforts to ensure that any such contractors, subcontractors, laboratory and consultants abide by the terms of this Consent Order.

C. No change in ownership or corporate status relating to the facility will in any way alter the Respondent's responsibilities under this Consent Order.

VII. ACCESS

A. To the extent that portions of the Site or areas where work is to be performed are owned by parties other than Respondent, Respondent shall use its best efforts to obtain voluntary access agreements from the owners, including any agreements necessary to

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provide access to OEPA and its authorized representatives. These agreements, if reduced to writing, are attached or will be attached hereto as Exhibits. In the event Respondent is unable to obtain such access, Respondent shall promptly notify OEPA regarding both the lack of access agreements and the efforts to obtain such access agreements and OEPA will contact the landowners.

B. OEPA through its authorized representatives shall have authority to enter all property at the Site and freely move about at all times that the facility is in operation, for purposes consistent with this Consent Order, and ORC Sections 3734.20, and 6111.05 including, but not limited to: inspection of records, operating logs, and contracts related to the investigative and cleanup work at the Site; reviewing the progress of the Respondent in carrying out the terms of this Consent Order; conducting such tests as OEPA or its Project Coordinator deems necessary; and verifying data submitted to OEPA by the Respondents. During regular business hours, the Respondent shall permit such OEPA representatives to inspect and request copies of all records, files, photographs, documents and other writings, including all sampling and monitoring data, which pertain to this Consent Order.

C. All parties with access to the Site and other areas where work is to be performed pursuant to this paragraph shall comply with the approved Health and Safety plan for the site. Nothing herein shall act to limit the statutory authority of OEPA to conduct inspections and gather information.

VIII. WORK TO BE PERFORMED

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A. Exhibit A to this Consent Order provides a Generic Statement of

Work ("SOW") for the completion of the RI/FS which is incorporated into and made a part of this Consent Order. The SOW is not specific to this site, and is to be used as the general outline in developing the site-specific Workplan. In the event of any conflict between any provisions in this Consent Order and the SOW, this Consent Order shall control in resolving any such conflict. OEPA agrees to review the hydrogeologic and other data generated by Respondent and heretofore voluntarily submitted to OEPA to determine its acceptability and usefulness in characterizing the nature and extent of contamination at the Site for purposes of the RI/FS contemplated by this Consent Order. Any data deemed acceptable by OEPA will be incorporated into the RI/FS. No data will be arbitrarily excluded from inclusion in the RI/FS.

B. The following work shall be performed:

1. Within seventy-five (75) days of the effective date of this Consent Order, Respondent shall submit a draft RI/FS Workplan to OEPA. The RI/FS Workplan shall reflect the fact that the RI may be performed in one or more phases, which shall be proposed by Respondent. The RI/FS Workplan shall reflect the fact that one or more interim actions may be proposed and performed by the Respondent as part of this Consent Order, and that a preliminary risk evaluation may be performed in connection with such interim action(s). The RI/FS Workplan shall be developed in conformance with the tasks set forth in the SOW and Ohio law. In addition, in making any determination whether reports, workplans or other deliverables are sufficient, OEPA will refer to the National Contingency Plan ("NCP"), 40 CFR Section 300 et seq., as

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amended, and the most current version of the following guidance documents:

a. Draft Guidance for Conducting Remedial Investigation and Feasibility Studies under CERCLA, OSWER 9355.3-01 October, 1988;

b. Risk Assessment Guidance for Superfund, Volume I - Human Health Evaluation Manual (Part A), Interim Final, EPA/540/1-89/002, December, 1989; OSWER 9285.4-1, October, 1986;

c. Superfund Exposure Assessment Manual, OSWER 9285.5-1, EPA/540/1-88/001, April, 1985;

d. RCRA Groundwater Monitoring Technical Enforcement Guidance Document (TEGD), OSWER 9950.0, September, 1986;

e. Remedial Actions for Contaminated Groundwater at Superfund Sites, OSWER 9283.1-2, August, 1988;

f. Data Quality Objectives for Remedial Response Activities, Volume I EPA/540/G-87/004 Example Scenario;

g. Superfund Remedial Design and Remedial Action Guidance, OSWER 9355.0-4A;

h. The Endangerment Assessment Handbook, U.S. EPA, August, 1985;

i. Toxicology Handbook, U.S. EPA, August, 1985;

j. Ecological Assessment of Hazardous Waste Sites: A Field and Laboratory Reference, EPA/600/3-89/013, March, 1989;

k. CERCLA Compliance with Other Laws Manual, OSWER 9234.1-01, March 6, 1988;

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l. Guidelines and Specifications for Preparing Quality Assurance Project Plans, Ohio EPA, March 5, 1990.

m. Interim Guidance on Superfund Selection of Remedy, J. Winston Porter, December 24, 1986;

n. U.S. EPA Integrated Risk Information System (IRIS) Data Base.

If OEPA determines that any additional guidance documents published and circulated as guidance by U.S. EPA or OEPA which are not inconsistent with the NCP, affect the work or schedules under this Consent Order, OEPA will notify Respondent and the work and schedules shall be modified as appropriate. Notwithstanding Respondent's acknowledgement that OEPA will or may refer to the foregoing guidance documents in order to assure that the work performed is consistent with the NCP, Respondent does not admit that such guidance documents are applicable to the work to be performed hereunder by statute or regulation.

2. The RI/FS Workplan submittal shall include and discuss all the items described in the SOW, attached hereto, and shall include a schedule for submittal of a draft Phase I RI Report, a final Phase I RI Report, any additional draft and final Phase RI Reports, as appropriate, a Draft RI Report, a Final RI Report, a draft FS Report, and a final FS Report. The RI/FS Workplan submittal shall also include and discuss any proposals for interim action(s) at this site or facility; OEPA retains the right to review and approve all workplans, draft and final reports, and all other documents or

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submittals relating to an interim action at this site or facility.

3. The draft RI/FS Workplan shall be subject to review, modification and approval or disapproval by OEPA in accordance with the procedures set forth in Section XIII below, of this Consent Order.

4. Upon final approval of the RI/FS Workplan, Respondent shall proceed promptly to implement the work detailed in the RI/FS Workplan in accordance with the schedule set forth therein. Unless otherwise directed by OEPA, Respondent shall not commence field activities until approval of the Workplan. Nothing in this section will prevent Respondent from taking any necessary emergency action; Respondent agrees to notify OEPA of any such emergency action taken.

5. When the final RI/FS Workplan, the final RI Report, and the final FS Report are approved by OEPA, they shall each be attached to this Consent Order and incorporated into and made a part hereof.

C. Should Respondent disagree with OEPA in the event of a disapproval of any report, workplan or other submittal required by this Consent Order, Respondent may elect to invoke the provisions of Article XIII and the obligation to prepare the disputed report, workplan or other submittal shall be suspended pending resolution of the dispute.

IX. DESIGNATED PROJECT COORDINATORS

Respondent and OEPA shall each designate a Project Coordinator and an alternate for the purpose of overseeing the implementation of this Consent Order. To the maximum extent possible, except as specifically

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provided in this Consent Order, communications between Respondent and OEPA concerning the terms and conditions of this Consent Order shall be made between the designated Project Coordinators. Each designated Project Coordinator shall be responsible for assuring that all communications from the other parties are appropriately disseminated and processed within their respective organizations. The Project Coordinators shall attempt to resolve disputes informally through good faith discussion on the technical issues.

Without limitation of any authority conferred on OEPA by statutes or regulations, the OEPA Project Coordinator's authority includes, but is not limited to: (1) taking samples or, in accordance with the terms of any workplan and in agreement with Respondent, directing the type, quantity and location of samples to be taken by the Respondent; (2) observing, and taking photographs and making such other reports on the progress of the work as deemed appropriate; (3) directing that work stop, for a period not to exceed 72 hours, whenever the OEPA Project Coordinator determines that activities at the site may create a present danger to public health or welfare or the environment; and (4) reviewing records, files and documents relevant to the Consent Order.

The Respondent's designated Project Coordinator or alternate shall be on-site at the Site during all hours of work at the Site and shall make himself/herself available for the pendency of this Consent Order. The absence of the OEPA Project Coordinator from the Site shall not be cause for stoppage of work unless otherwise provided.

OEPA and Respondent each has the right to change their respective Project Coordinator. Such a change shall be accomplished by notifying the other party in writing at least five days prior to the change, if possible, otherwise as soon thereafter as possible.

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X. REPORTING

Respondents shall submit monthly written progress reports which describe the activities which have been taken toward achieving compliance during the previous month, as well as activities which are scheduled for the next month, to OEPA by the tenth day of every month following the effective date of this Consent Order, unless otherwise designated pursuant to this Consent Order.

At a minimum, these reports shall:

1. Identify the Site and activity;
2. Describe status of work at the Site and progress to date;
3. Describe difficulties encountered during the reporting period;
4. Describe actions being taken to rectify problems;
5. Describe activities planned for the next month; and
6. Identify changes in key personnel.

The monthly progress reports will list target and actual completion dates for each element of activity, including the project completion, and provide an explanation of any deviation from the milestones in the Workplan schedules.

Such progress reports and any other documents, reports, approvals, or correspondence submitted pursuant to this Consent Order shall be sent to the OEPA at the following addresses (or to such other address as the OEPA may hereafter designate in writing):

Ohio EPA
1800 WaterMark Drive.
P. O. Box 1049
Columbus, Ohio 43266-0149
ATTN: Technical and Program Support Section, Div of Emergency and Remedial Response and Legal Section

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Ohio EPA
Central District Office
P.O. Box 2198
2305 Westbrooke Drive, Building C
Columbus, Ohio 43228
ATTN: Supervisor, DERR

All correspondence to the Respondent will be directed to the following addresses (or to such other addresses as the Respondent may hereafter designate in writing):

(1) Rockwell International Corporation
On-Highway Products
Hebron Road
Heath, Ohio 43056
ATTN: Mr. Jim Haff

(2) Thompson, Hine and Flory
1100 National City Bank Building
Cleveland, Ohio 44114
ATTN: David E. Nash, Esq.

OEPA may, at its discretion, direct that reports or plans or proposals made pursuant to the Consent Order be submitted at extended intervals or that no further reports need be submitted.

XI. SAMPLING AND DATA/DOCUMENT AVAILABILITY

OEPA and Respondent shall make available to each other the results of sampling, tests or other data generated by any of them, or on their behalf, with respect to the implementation of this Consent Order.

All sampling within the scope of this Consent Order shall allow for split or duplicate samples to be made at the request of either party during the implementation of the Consent Order. To coordinate the split sampling, any party taking samples, either pursuant to a Workplan or otherwise, shall notify the other party's Project Coordinator not less than five (5) business days (unless otherwise agreed between the Project Coordinators) in advance of any sample collection.

Respondent shall preserve, during the pendency of this Consent

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Order and for a minimum of ten (10) years after notice of its termination under Article XXII herein, one copy of all records and documents within its possession or that of its divisions, employees, agents, accountants, contractors or attorneys which relate to work performed under this Consent Order, despite any document retention policy to the contrary. Such copies may be retained in any medium Respondent chooses, but shall be made available to OEPA as hardcopy, or on microfilm or microfiche. At any time within the ten (10) year period and upon request of OEPA, Respondent shall make one copy of the documents available in the format of Respondent's choice at the time of the request from OEPA.

XII. CONFIDENTIAL INFORMATION

Respondent may assert a claim of business confidentiality covering the information requested by this Consent Order, except for analytical data, pursuant to Ohio Administrative Code (OAC) Rule 3745-49-03(A). Information determined to be confidential by OEPA will be afforded protection under OAC Rule 3745-49-03. If no such claim accompanies the information when it is submitted to OEPA, it may be made available to the public by the OEPA without further notice to Respondent.

XIII. REVIEW OF SUBMITTALS AND PROPOSED MODIFICATIONS, RESOLUTION OF DISPUTES

A. Respondent shall submit all documents required by the workplans or otherwise required by Article VIII of this Consent Order to OEPA pursuant to the criteria and schedules set forth therein; provided, however, that Respondent may request extensions or modifications of any schedules set forth therein. Respondent shall submit all raw data and all original reports of analytical procedures and results to OEPA within ten (10) business days after Respondent receives such raw data and reports from each laboratory

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involved in the analyses of any samples collected at or near the Site. Respondent may submit to OEPA any interpretive reports and written explanations concerning such raw data and original laboratory reports. Such interpretive reports or explanations must be submitted with the original laboratory reports and raw data.

B. OEPA agrees to review each document within thirty (30) business days of receipt and advise Respondent in writing as to whether the document is approved or disapproved in whole or in part. Failure of OEPA to review within thirty (30) business days of receipt shall not be considered a violation of this Order. Complex documents may require a longer review period, in which case, OEPA shall notify Respondent of that fact within thirty (30) business days of receipt of the document. Documents which are submitted in sections or which form the basis for a more extensive final required submittal shall be reviewed when the final completed document is submitted to OEPA. In the event Respondent is notified that a document is disapproved in whole or in part, OEPA shall include a statement in the notification as to the modifications or additions which must be addressed in the document prior to approval, and an explanation as to why such modifications or additions are necessary. Within thirty (30) business days of receipt of OEPA notification requiring modifications or additions, Respondent shall amend and submit to OEPA a revised document which addresses all comments, modifications or additions required by OEPA. Disputes regarding the final content of any document shall be resolved as provided in this Article.

In the event such modifications or additions delay the time

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schedules set forth in the workplans, schedules may be adjusted accordingly upon agreement of the parties; such agreement will not be unreasonably withheld by OEPA, and such delay shall not be considered a violation of this Consent Order. Delays in performance of the work described in the workplans due to OEPA document review time which exceeds the period of review provided in the schedule shall not be considered a violation of this Consent Order. The period for performance of activities contingent on completion of OEPA document review shall be extended for a time not to exceed the actual delay occasioned by OEPA review.

C. In the event of subsequent disapproval of modified or additional work submitted by Respondent, including but not limited to OEPA's disapproval of Respondent's proposed remedial actions, OEPA retains the right to modify such reports, to perform additional studies, and to conduct a complete Remedial Investigation and Feasibility Study, or to enforce the terms of this Consent Order; provided, however, OEPA agrees to first initiate the dispute resolution procedures contained in Paragraph F. of this Article. Failure to submit the modifications or additions to the work shall be deemed noncompliance with the terms of this Consent Order on the part of Respondent and grounds for termination of or enforcement of this Consent Order by OEPA. In the event of termination, OEPA retains all rights provided by federal and state statutes and regulations including, but not limited to, conducting a complete RI/FS, implementing RD/RA, and Respondent retain all rights and defenses provided by law, except with respect to challenges to jurisdiction referenced in Article V., above.

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D. No modification or addition shall be made by the Respondent in the workplans or other documents as approved and described in Article VIII without written notification to and written approval of the OEPA. The notification required by this paragraph shall set forth the nature of and reasons for the requested modification.

E. If Respondent does not object to the modifications or additions made pursuant to paragraph B of this Article, Respondent shall expeditiously undertake and complete such measures in accordance with the schedule of completion, or a revised schedule of completion, as necessary and appropriate. If Respondent objects to any proposed modifications or additions, or schedules for the performance of such modified or additional work, Respondent shall, within thirty (30) business days after receiving written notice of those modifications or additions, or changes in schedules, initiate the dispute resolution procedure set forth below in paragraph F of this Article; provided, however, that Respondent shall not initiate the dispute resolution procedure provided for herein unless Respondent's good faith estimate of the cost of OEPA's requested modifications or additions involving related tasks in the aggregate exceed $5,000.00.

F. The Project Coordinators shall, whenever possible, operate by consensus, and in the event that there is a disapproval of any report or document or other submittal required under this Order, or disagreement about the conduct or extent of the work performed or required under this Consent Order, or modified or additional work or schedules required under this Consent Order, the Project Coordinators shall negotiate in good faith for ten (10) business days to resolve the differences.

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In the event that the Project Coordinators are unable to reach consensus on the disapproval or disagreement in ten (10) business days, then each Project Coordinator shall reduce his/her position to written form within five (5) business days of the end of the good faith negotiations referenced above. Those written positions shall be immediately exchanged by the Project Coordinators. Following the exchange of written positions, the parties shall have an additional ten (10) business days to resolve their differences. If OEPA concurs with the position of the Respondent, OEPA will modify the document at issue or the Consent Order to include necessary extensions of time or variances of required work. If OEPA does not concur with the position of the Respondent, OEPA will resolve the dispute based upon and consistent with the Consent Order, the workplans, and Ohio Revised Code Chapters 3734. and 6111., and the regulations promulgated thereunder. Upon written request made within five (5) business days of notice of such resolution, Respondent shall have the right to have the dispute reviewed by the Chief of the Division of Emergency and Remedial Response. If the dispute is not then resolved to the satisfaction of Respondent, Respondent shall have the right to have the dispute reviewed by the Legal Advisor to the Director; such request by Respondent shall be made within five (5) business days of the resolution by the Chief of the Division of Emergency and Remedial Response. The Director of the OEPA retains the right to resolve all continuing disputes, such resolution to be made in accordance with the Consent Order, the work plans, and all appropriate state and/or federal law. All deadlines affected by the dispute shall be tolled during the pendency of any

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disagreement between OEPA and Respondent. The time period for such deadline shall not recommence until the parties resolve their differences and Respondent has received written approval to proceed from OEPA. A delay resulting from a dispute between the parties under this Article shall not be considered a violation of this Consent Order. Elements of work not affected by the dispute will be completed in accordance with the schedules contained in the workplans.

XIV. RESERVATION OF RIGHTS

A. Notwithstanding compliance with the terms of this Consent Order, but subject to Articles XXI and XXII below, the Respondent is not released from liability, if any, for any thing beyond the terms of this Consent Order. OEPA reserves the right to take any enforcement action pursuant to any available legal authority, including, but not limited to the right to seek injunctive relief, monetary penalties, natural resources damages, and punitive damages for any violation of this Consent Order or Chapters 3734., 3745., and 6111. of the Ohio Revised Code.

B. Except as with respect to challenges to jurisdiction referenced in Article V, above, the Respondent and OEPA expressly reserve all rights and defenses that they may have, including OEPA's right both to disapprove the work performed by the Respondent and to request that the Respondent perform tasks in addition to those detailed in the RI/FS Workplan, including RI work and/or engineering evaluation necessary to conform with the provisions of this Consent Order. In the event that the Respondent declines to perform the work or declines to perform any additional and/or modified tasks, OEPA will have the right to undertake any remedial

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investigation, feasibility study work, and/or remedial action. In addition, OEPA reserves the right to undertake removal actions and/or remedial actions in accordance with ORC Sections 3734.20 through 3734.26, or Section 107 of CERCLA, or any applicable law. In any event, OEPA reserves the right to seek reimbursement from the Respondent thereafter for such costs incurred by the State of Ohio.

C. Subject to the terms and conditions of this Consent Order, nothing shall waive the right of OEPA to enforce this Consent Order under ORC Chapters 6111. and 3734.

D. Any additional tasks within the scope of this Consent Order determined to be necessary by Respondent shall be subject to approval by OEPA and shall be completed in accordance with standards, specifications, and any necessary new or revised work schedules determined or approved by OEPA, which shall be attached to and incorporated into this Consent Order and made an enforceable part thereof.

E. In the event of disagreement about the need for or the conduct of additional work, the parties agree to follow the procedures in Article XIII above for resolution of disputes.

XV. OTHER CLAIMS

Nothing herein is intended to release, discharge, or in any way affect any claims, causes of action or demands in law or equity against any person, firm, partnership or corporation not a signatory to this Consent Order from any liability he, she, or it may have arising out of or relating in any way to the generation, storage, treatment, handling, transportation, release or disposal of any hazardous wastes, hazardous substances, industrial wastes, other wastes, or pollutants at, to or

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from the Site. The parties to this Consent Order expressly reserve all rights (including any right to contribution or indemnity possessed by the Respondent against any other parties who may be responsible for actual or threatened releases at the Site), claims, demands and causes of action they have or may have against any and all other persons and entities not parties to this Consent Order.

XVI. LAND USE

Respondent shall assure that no portion of the Site will be used in any manner which would adversely affect the integrity of any containment systems which may remain at the Site or monitoring systems installed pursuant to this Consent Order. Respondent shall notify OEPA by registered mail at least thirty (30) calendar days prior to any conveyance or an intent to convey any interest in land which is known to comprise the Site and of the provision made for continued maintenance of the system or systems. Respondent shall assure that the notice set forth below be put in any deed which is executed and delivered prior to termination of these Findings and Orders. The referenced notice shall state:

The real property which is transferred by this deed is subject to Director's Final Findings and Orders of the Ohio Environmental Protection Agency dated November ____, 1990 (effective date) ("Findings and Orders"). The Findings and Orders require that the Grantor perform a Remedial Investigation and Feasibility Study relating to a portion of the property. A copy of the Findings and Orders has been provided to the Grantee by the Grantor.

XVII. OTHER APPLICABLE LAWS

All actions required to be taken pursuant to this Consent Order shall be undertaken in accordance with the requirements of all

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applicable local, state and federal laws and regulations including all environmental laws and regulations. OEPA will use its best efforts to promptly consider and decide upon all permit applications which Respondent may be required to submit pursuant to the work required to be performed under this Consent Order. Any deadline pursuant to this Consent Order which is affected by OEPA approval of a permit application shall be tolled until such time as the permit in question is granted.

So long as Respondent remains in compliance with all environmental laws and this Consent Order, OEPA will assist Respondent in encouraging the United States Environmental Protection Agency to avoid initiating activity at this site which would be duplicative of, or inconsistent with, work required by this Order.

XVIII. INDEMNITY

A. To the extent legally permissible, Respondent agrees to indemnify, save and hold harmless OEPA from any and all claims or causes of action arising from, or on account of, acts or omissions of the Respondent, its officers, employees, receivers, trustees, agents, or assigns, in carrying out any activities pursuant to this Consent Order. OEPA shall not be considered a party to and shall not be held liable under any contract entered into by the Respondent in carrying out the activities pursuant to this Consent Order. Consistent with federal, state, and common law, nothing in this Consent Order shall render Respondent liable for any act or omission of OEPA.

B. OEPA agrees to provide notice to Respondent within thirty (30) days of receipt of any claim which may be the subject of the indemnity in paragraph A., above, and Respondent agrees to

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cooperate with OEPA in the defense of any such claim or action against OEPA; provided that, parties asserting claims or defenses against each other are excluded from this requirement to the extent of their dispute.

XIX. UNAVOIDABLE DELAYS

A. Respondent shall cause all work to be performed within the agreed time schedules provided for in the approved Workplan, unless any such performance is prevented or delayed by an event which constitutes an unavoidable delay. For purposes of this Consent Order, an "unavoidable delay" shall mean any event(s) beyond the control of the Respondent which prevents or delays performance of any obligation required by this Consent Order and which could not be overcome by due diligence on the part of the Respondent. Increased costs of compliance shall not be considered circumstances beyond the control of the Respondent.

B. Respondent shall notify the OEPA in writing no later than ten (10) business days after its discovery of the occurrence of any event which the Respondent contends is an unavoidable delay. Where Respondent believes that OEPA is causing a delay which constitutes an unavoidable delay, it shall so notify OEPA within fifteen (15) business days. Such written notification shall describe the anticipated length of the delay, the cause or causes of the delay, the measures taken and to be taken by the Respondent to minimize the delay, and the timetable under which these measures will be implemented. The Respondent shall have the burden of demonstrating that the event(s) constitute(s) an unavoidable delay.

C. In the event that any unavoidable delay affects time schedules or

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deadlines set pursuant to this Consent Order, the Consent Order, including incorporated documents and any affected schedules thereunder, may be modified.

XX. REIMBURSEMENT OF COSTS

A. The Respondent shall reimburse OEPA for all oversight costs not inconsistent with the National Contingency Plan, 40 CFR Part 300, et seq, as amended, incurred by OEPA in connection with this Consent Order from the effective date hereof. The parties anticipate that OEPA's oversight costs will not exceed ten thousand dollars ($10,000.00) per year in the absence of unforeseen circumstances. This goal is a non-binding target to assist Respondent and OEPA in their respective financial planning. Within ninety (90) days of the end of each calendar year, OEPA will submit to the Respondent itemized statements of such costs of the OEPA for the previous year. Following receipt of the itemized statements, within sixty (60) calendar days, the Respondent shall make payment to the Ohio Hazardous Waste Clean-up Special Account created by ORC Section 3734.28 by check payable to "Treasurer, State of Ohio" and shall be forwarded to Frances M. Kovac, (or her successor), Counsel for Director of Environmental Protection, P. O. Box 1049, 1800 WaterMark Drive, Columbus, Ohio 43266-0149.

B. A copy of the transmittal letter and a photocopy of the check shall be sent to Fiscal Officer, Division of Emergency and Remedial Response, Ohio EPA.

C. In the event that Respondent fails to complete the RI/FS in compliance with the terms of this Consent Order, OEPA reserves its right to bring an action against Respondent to enforce this Order

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for recovery of past response costs in connection with the Site and any costs incurred in oversight of Respondent's implementation of this Consent Order (which are not paid pursuant to paragraph A of this Article) and all costs associated with OEPA's performance of the RI/FS or any part thereof. Nothing in this Paragraph shall preclude Respondent from asserting any legal or equitable defense to such action. Nothing in this Consent Order shall be construed as a waiver of any right that OEPA may have to seek reimbursement of any response costs from any person not a party hereto.

D. Respondent retains the right to dispute costs which, in its opinion, are inconsistent with the NCP, and the procedures set forth in Article XIII, Paragraph F. shall apply.

XXI. COVENANT NOT TO SUE

Upon termination of this Consent Order pursuant to Article XXII of this Consent Order, OEPA covenants not to sue Respondent for penalties or damages which may have been available under applicable law to OEPA absent the conduct and completion of the activities and work called for in this Consent Order and Respondent shall be released from obligations embodied in this Consent Order.

XXII. TERMINATION AND SATISFACTION

Respondent shall provide written notice to OEPA when work contemplated by this Consent Order for the Site is completed, requesting written notice from OEPA that such work for the Site has in fact been completed in accordance with this Consent Order to the satisfaction of OEPA. OEPA shall provide Respondent with a written notice of completion, such notice of completion not to unreasonably withheld, provided that the Respondent has demonstrated, to the

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satisfaction of OEPA, that all of the terms of this Consent Order have been completed or with a denial, including specific reasons for denial. In the event of a denial, Respondent and OEPA shall mutually agree to resolve the impediments to completion of the work required by this Consent Order in accordance with the provisions of Article XIII above. The provisions of this Consent Order shall be deemed satisfied upon Respondent's receipt of such written notice from OEPA.

XXIII. AMENDMENT AND EFFECTIVE DATE

The provisions of this Consent Order may be amended by mutual agreement of OEPA and the Respondents.

This Consent Order and any amendment of this Consent Order under this Article shall be in writing, signed by OEPA and the Respondent, and shall have as the effective date that date on which such Order or amendment is entered in the Journal of the Director of the OEPA.

XXIV. ADDITIONAL WORK

In the event that OEPA or Respondent determine that additional work, including RI work and/or engineering evaluation, is necessary to accomplish the objectives of this Consent Order, notification in writing of such additional work shall be provided to the other party.

Any additional work determined to be necessary by the Respondent shall be subject to approval by OEPA.

Any additional work determined to be necessary by the Respondent and approved by OEPA or determined to be necessary by OEPA shall be completed by Respondent in accordance with the standards, specifications, and schedule determined by OEPA, all to be consistent with the terms and conditions of this Consent Order.

Any request for additional work under this section shall be subject to the provisions of Article XIII.

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IN THE MATTER OF ROCKWELL INTERNATIONAL CORPORATION, ON-HIGHWAY PRODUCTS:

IT IS SO ORDERED.

By: R L Shank
Richard L. Shank, Ph.D.
Director
Ohio Environmental Protection Agency

Date

By signature below, Respondent Rockwell International Corporation, On-Highway Products signifies its consent to the issuance of this Consent Order, and hereby waives any right to appeal the issuance of this Consent Order.

IT IS SO AGREED:

By: Forrest R Hayford
Rockwell International Corporation,
On-Highway Products

10/15/90
Date

Forrest R. Hayford
Typed or printed name

Plant Manager
Title

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GENERIC STATEMENT OF WORK
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
STATE VERSION

REMEDIAL INVESTIGATION

PURPOSE:

The purpose of this remedial investigation is to determine the nature and extent of releases of hazardous waste or constituents, pollutants, wastes, industrial wastes or contaminants from regulated units, solid waste management units and other sources at the site or facility and to gather all necessary data to support the feasibility study. The respondent shall furnish all personnel, materials and services necessary for, or incidental to, performing the remedial investigation at [specific site or facility].

SCOPE:

The remedial investigation consists of seven tasks:

Task 1 -- Description of Current Conditions

- A. Facility or Site Background
- B. Nature and Extent of Contamination
- C. Implementation of Interim Measures

Task 2 -- Pre-investigation Evaluation of Remedial Technologies

Task 3 -- RI Workplan Requirements

- A. Project Management Plan
- B. Data Collection Quality Assurance Plan
- C. Data Management Plan
- D. Health and Safety Plan

Task 4 -- Remedial Investigation

- A. Environmental Setting
- B. Source Characterization
- C. Contamination Characterization
- D. Potential Receptor Identification

Task 5 -- Investigation Analysis

- A. Data Analysis
- B. Protection Standards

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Task 6 -- Laboratory and Bench-Scale Studies

Task 7 -- Reports

A. Preliminary and Workplan
B. Progress
C. Draft and Final

TASK 1 -- DESCRIPTION OF CURRENT CONDITIONS

The Respondent shall describe the background of the site or facility, it's current condition and outline the purpose and need for remedial investigation of the site or facility. Data gathered during previous investigations, site inspections and other relevant activities shall be used. Previous investigations shall be summarized and referenced.

A. Site or Facility Background. Respondent shall prepare a report of the regional location, pertinent area boundary features and general site or facility physiography, hydrology, geology and current and historic land and water use. The total area of the site or facility and the general history relative to the use of the site or facility for hazardous or solid waste or hazardous substance activity should be defined. The Respondent's report shall include:

1. Map(s) depicting the following:

a. General geographic location;

b. Property lines, with the owners of all adjacent property clearly indicated;

c. Topography and surface drainage (with a contour interval of [number] feet and a scale of 1" = 100 feet) depicting all waterways, wetlands, floodplains, water features, drainage patterns and surface water containment areas;

d. All tanks, buildings, utilities, paved areas, easements, rights-of-way and other features;

e. All solid or hazardous waste treatment, storage or disposal areas active after November 19, 1980;

f. All known past solid or hazardous waste treatment, storage or disposal areas regardless of whether they were active on

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November 19, 1980;

g. All known past and present product and waste underground tanks or piping;

h. General types of vegetative cover (wetlands, grasses, weeds, shrubs and trees) at the site or facility; their areal extent; the species, height and diameter of trees at the facility or site; the quality of the vegetation as wildlife habitat, food source for wildlife or migration corridor for wildlife; any site or facility features that would tend to attract wildlife from surrounding areas; a list of game fish and game animals that use the site or facility and an interpretation of the site's significance to those species;

i. Surrounding land use (residential, commercial, agricultural, recreational, wildlife habitat) and demographics; and

j. A summary of any fish, wildlife or domestic animal kills or diseases that may be related to releases.

k. The location of all public, private and industrial production and ground water monitoring wells within a one mile radius of the site or facility. These wells shall be clearly labeled and ground and top-of-casing elevations and construction details included (these elevations and details may be included as an attachment). This information should include installation methods, if known, and copies of well logs available from the Ohio Department of Natural Resources; Division of Water.

All maps shall be consistent with the requirements set forth in 40 CFR 270.14 [insert appropriate state citation] and be of sufficient detail and accuracy to locate and report all current and future work performed at the site. All elevation data should correspond with U.S.G.S. Datum (Mean Sea Level).;

2. A description of regional hydrogeology/geology in the vicinity of the site or facility. The description should be based on existing information, such as well logs filed at Ohio Department

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of Natural Resources (ODNR); ODNR ground water and basin maps, soil surveys and U.S.G.S. topographic maps or any site-specific work that has been conducted. (If site-specific work has been conducted, the methods and procedures used to collect the data shall be included.)

The description shall include:

a. Depth to bedrock and lithology;

b. Characteristics of major stratigraphic units and the depositional environment;

c. The average yield of water wells within a one mile radius of the site or facility;

d. Direction of ground water flow in regional aquifer systems;

e. Identification and characterization of recharge and discharge areas, including amount of recharge and discharge;

f. A description of the regional geomorphology, including locations of surface water bodies, floodways, etc. This description should include an analysis of any topographic features that may influence the ground water flow system, and;

g. A description of structural features such as jointing, faulting and folding.

3. A history and description of ownership and operation, solid and hazardous waste generation, treatment, storage and disposal activities at the facility or site;

4. Appropriate dates or periods of past product and waste spills, identification of the materials spilled, the amount spilled, the location where spilled and a description of the response actions conducted (local, state or federal response units or private parties), including any inspection reports or technical reports generated as a result of the response; and

5. A summary of past permits requested and/or received, any enforcement actions and their subsequent responses and a list of documents and studies prepared for the site or facility.

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B. Nature and Extent of Contamination. Respondent shall prepare a report describing the existing information on the nature and extent of contamination.

1. The Respondent's report shall discuss all possible source areas of contamination. This, at a minimum, should include all regulated units, solid waste management units, spill areas and other suspected source areas of contamination. For each area, Respondent shall identify the following:

   a. Location of unit or area (which shall be depicted on a facility or site map);

   b. Quantities of solid or hazardous wastes;

   c. Hazardous waste or constituents, to the extent known; and

   d. Identification of areas where additional information is necessary.

2. The Respondent shall prepare an assessment and description of the existing degree and extent of contamination. This shall include:

   a. Available monitoring data and qualitative information on locations and levels of contamination at the site or facility;

   b. All potential migration pathways including information on geology, pedology, hydrogeology, physiography, hydrology, biological features, water quality, meteorology and air quality; and

   c. The potential impact(s) on human health and the environment (which includes physical, chemical and biological components), including demography, ground-water and surface-water use, and land use.

C. Implementation of Interim Measures.

1. The Respondent's report shall document interim measures which were or are being undertaken at the site or facility. This shall include:

   a. Objectives of the interim measures: how the measure is mitigating a potential threat to

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human health and the environment and/or is consistent with and integrated into any long term remedial action at the facility or site;

b. Design, construction, operation and maintenance requirements;

c. Schedules for design, construction and monitoring; and

d. Schedule for progress reports.

2. At any time during the Remedial Investigation, Respondent or OEPA may suggest that the Respondent conduct an interim remedial action. The following factors shall be considered in determining the appropriateness of an interim remedial action:

a. Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous wastes or substances;

b. Actual or potential contamination of drinking water supplies or sensitive ecosystems;

c. Hazardous waste or substances in drums, barrels, tanks or other bulk storage containers that may pose a threat of release;

d. High levels of hazardous waste or substances in soils largely at or near the surface that may migrate;

e. Weather conditions that may cause hazardous waste or substances to migrate or be released;

f. Threat of fire or explosion; and

g. Other situations or factors that may pose threats to public health, welfare or the environment.

TASK 2 -- PRE-INVESTIGATION EVALUATION OF REMEDIAL TECHNOLOGIES

Prior to starting the Remedial Investigation, Respondent shall prepare a report that identifies the potential remedial technologies that may be used on-site or off-site for the containment, treatment, remediation and/or disposal of contamination or contaminated media. This report shall also identify any field

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data that needs to be collected in the Remedial Investigation to facilitate the evaluation and selection of the final remedial action or actions (e.g., compatibility of waste and construction materials, information to evaluate effectiveness, treatability of waste or contaminated media, etc.).

TASK 3 -- RI WORKPLAN REQUIREMENTS

The respondent shall prepare a Remedial Investigation Workplan. This RI Workplan shall include the development of several plans, which shall be prepared concurrently. During the Remedial Investigation, it may be necessary to revise the RI Workplan to increase or decrease the detail of information collected to accommodate facility- or site-specific conditions. The RI Workplan shall include the following:

A. Project Management Plan

The Respondent shall prepare a Project Management Plan which will include a discussion of the technical approach, schedules, budget and personnel. The Project Management Plan will also include a description of qualifications of personnel performing or directing the RI, including contractor personnel. This plan shall also document the overall management approach to the Remedial Investigation.

B. Data Collection Quality Assurance Plan

The Respondent shall prepare a plan to document all monitoring procedures: sampling, field measurements and sample analysis performed during the investigation to characterize the environmental setting, source and contamination to ensure that all information, data and resulting decisions are technically sound, statistically valid and properly documented.

1. Data Collection Strategy

The strategy section of the Data Collection Quality Assurance Plan shall include but not be limited to the following:

a. Description of the intended uses for the data, and the necessary level of precision and accuracy for these intended uses;

b. Description of methods and procedures to be used to assess the precision, accuracy and completeness of the measurement data;

c. Description of the rational used to assure

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that the data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, a process condition or an environmental condition. Examples of factors which shall be considered and discussed include:

i) Environmental conditions at the time of sampling;

ii) Number of sampling points;

iii) Representativeness of selected media; and

iv) Representativeness of selected analytical parameters.

d. Description of the measures to be taken to assure that the following data sets can be compared to each other:

i) RI data collected by the Respondent over some time period;

ii) RI data generated by an outside laboratory or consultant employed by the Respondent versus data collected by the Respondent, and;

iii) Data generated by separate consultants or laboratories over some time period not necessarily related to the RI effort.

e. Details relating to the schedule and information to be provided in quality assurance reports. These reports should include but not be limited to:

i) Periodic assessment of measurement data accuracy, precision and completeness;

ii) Results of performance audits;

iii) Results of system audits;

iv) Significant quality assurance problems and recommended solu-

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tions; and

v) Resolutions of previously stated problems.

2. Sampling

The Sampling section of the Data Collection Quality Assurance Plan shall discuss:

a. Selecting appropriate sampling locations, depths, etc.;

b. Providing a statistically sufficient number of sampling sites;

c. Measuring all necessary ancillary data;

d. Determining conditions under which sampling should be conducted;

e. Determining which media are to be sampled (e.g., ground water, air, soil, sediment, biota, etc.);

f. Determining which parameters are to be measured and where;

g. Selecting the frequency of sampling and length of sampling period;

h. Selecting the types of sample (e.g., composites vs. grabs) and number of samples to be collected;

i. Selecting the number, location and media for determining background conditions;

j. Measures to be taken to prevent contamination of the sampling equipment and cross contamination between sampling points;

k. Documenting field sampling operations and procedures, including;

i) Documentation of procedures for preparation of reagents or supplies which become an integral part of the sample (e.g., filters and adsorbing reagents);

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ii) Procedures and forms for recording the exact location and specific considerations associated with sample acquisition;

iii) Documentation of specific sample preservation method;

iv) Calibration of field devices;

v) Collection of replicate and field duplicate samples;

vi) Submission of field-biased and equipment blanks, where appropriate;

vii) Potential interferences present at the site or facility;

viii) Construction materials and techniques associated with monitoring wells and piezometers;

ix) Field equipment listing and sample containers;

x) Sampling order; and

xi) Decontamination procedures.

l. Selecting appropriate sample containers;

m. Sample preservation; and

n. Chain-of-custody, including:

i) Standardized field tracking reporting forms to establish sample custody in the field prior to and during shipment;

ii) Sample sealing, storing and shipping procedures to protect the integrity of the sample; and,

iii) Pre-prepared sample labels containing all information necessary for effective sample tracking.

3. Field Measurements

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The Field Measurements section of the Data Collection Quality assurance Plan shall discuss:

a. Selecting appropriate field measurement locations, depths, etc.;

b. Providing a statistically sufficient number of field measurements;

c. Measuring all necessary ancillary data;

d. Determining conditions under which field measurement should be conducted;

e. Determining which media are to be addressed by appropriate field measurements (e.g., ground water, air, soil, sediment, etc.);

f. Determining which parameters are to be measured and where;

g. Selecting the frequency of field measurement and length of field measurements period; and

h. Documenting field measurement operations and procedures, including:

   i) Procedures and forms for recording raw data and the exact location, time and site or facility specific considerations associated with the data acquisition;

   ii) Calibration of field devices;

   iii) Collection of replicate measurements;

   iv) Submission of field-biased blanks, where appropriate;

   v) Potential interferences present at the site or facility;

   vi) Construction materials and techniques associated with monitoring wells and piezometers used to collect field data;

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vii) Field equipment listing;

viii) Order in which field measurements were made; and

ix) Decontamination procedures.

4. Sample Analysis

The Sample Analysis section of the Data Collection Quality Assurance Plan shall specify the following:

a. Chain-of-custody procedures, including:

i) Identification of a responsible party to act as sample custodian at the laboratory facility authorized to sign for incoming field samples, obtain documents of shipment and verify the data entered onto the sample custody records;

ii) Provision for a laboratory sample custody log consisting of serially numbered lab-tracking report sheets; and

iii) Specification of laboratory sample custody procedures for sample handling, storage and dispersement for analysis.

b. Sample storage procedures and storage times;

c. Sample preparation methods;

d. Analytical procedures, including:

i) Scope and application of the procedure;

ii) Sample matrix;

iii) Potential interferences;

iv) Precision and accuracy of the methodology; and

v) Method detection limits.

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e. Calibration procedures and frequency;

f. Data reduction, validation and reporting;

g. Internal quality control checks, laboratory performance and systems audits and frequency, including:

i) Method blank(s);

ii) Laboratory control sample(s);

iii) Calibration check sample(s);

iv) Replicate sample(s);

v) Matrix-spiked sample(s);

vi) "Blind" quality control sample(s);

vii) Control charts;

viii) Surrogate samples;

ix) Zero and span gases; and

x) Reagent quality control checks.

h. Preventative maintenance procedures and schedules;

i. Corrective action (for laboratory problems); and

j. Turnaround time.

C. Data Management Plan

The Respondent shall develop and initiate a Data Management Plan to document and track investigation data and results. This plan shall identify and set up data documentation materials and procedures, project file requirements and project-related progress reporting procedures and documents. The plan shall also provide the format to be used to present the raw data and conclusions of the investigation.

1. Data Record

The data record shall include the following:

a. Unique sample or field measurement code;

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b. Sampling or field measurement location and sample or measurement type;

c. Sampling or field measurement raw data;

d. Laboratory analysis ID number;

e. Property or component measured; and

f. Result of analysis (e.g., concentration).

2. Tabular Displays

The following data shall be presented in tabular displays:

a. Unsorted (raw) data;

b. Results for each medium, or for each constituent measured;

c. Data reduction for statistical analysis;

d. Sorting of data by potential stratification factors (e.g., location, soil layer, topography); and

e. Summary data.

3. Graphical Displays

The following data shall be presented in graphical formats (e.g., bar graphs, line graphs, area or plan maps, isopleth plots, cross-sectional plots or transects, three dimensional graphs, etc.):

a. Display sampling locations and sampling grid;

b. Indicate boundaries of sampling area, and areas where more data are required;

c. Display levels of contamination at each sampling location;

d. Display geographical extent of contamination;

e. Display contamination levels, averages and maxima;

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f. Illustrate changes in concentration in relation to distance from the source, time, depth or other parameters; and

g. Indicate features affecting intramedia transport and show potential receptors.

D. Health and Safety Plan. The Respondent shall develop a Health and Safety plan to protect the health and safety of personnel involved in the site investigations and the surrounding community.

1. Major elements of the Health and Safety Plan shall include:

a. Facility or site description including availability of resources such as roads, water supply, electricity and telephone service;

b. Description of the known hazards and an evaluation of the risks associated with the incident and with each activity conducted;

c. Listing of key personnel (including the site safety and health officer) and alternates responsible for site safety, response operations, and for protection of public health;

d. Delineation of work area, including a map;

e. Description of levels of protection to be worn by personnel in the work area;

f. Description of the medical monitoring program for on-site responders;

g. Description of standard operating procedures established to assure the proper use and maintenance of personal protective equipment;

h. The establishment of procedures to control site access;

i. Description of decontamination procedures for personnel and equipment;

j. Establishment of site emergency procedures;

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k. Availability of emergency medical care for injuries and toxicological problems;

l. Description of requirements for an environmental monitoring program. (This should include a description of the frequency and type of air and personnel monitoring, environmental sampling techniques and a description of the calibration and maintenance of the instrumentation used.);

m. Specification of any routine and special training required for responders; and

n. Establishment of procedures for protecting workers from weather-related problems.

2. The Health and Safety Plan shall be consistent with:

a. NIOSH Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities (1985);

b. Section 111(c)(6) of CERCLA;

c. EPA Order 1440.1 -- Respiratory Protection;

d. EPA Order 1440.3 -- Health and Safety Requirements for Employees Engaged in Field Activities;

e. EPA Occupational Health and Safety Manual;

f. EPA Interim Standard Operating Safety Procedures and other EPA guidance as developed by EPA;

g. OSHA regulations particularly in 29 CFR 1910 and 1926;

h. State and local regulations; and

i. Site or facility conditions.

The Safety Plan should identify problems or hazards that may be encountered and their solution. Safety procedures to be followed to protect third parties, such as visitors or the surrounding community, should also be provided.

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TASK 4 -- REMEDIAL INVESTIGATION

The Respondent shall conduct those investigations necessary to: characterize the site or facility (Environmental Setting); define the source (Source Characterization); define the degree and extent of contamination (Contamination Characterization); and identify actual or potential receptors.

The investigations should result in data of adequate technical quality to support the development and evaluation of the remedial action alternatives of the Feasibility Study.

Remedial Investigation activities shall follow the plans set forth in Task 3. All sampling and analyses shall be conducted in accordance with the Data Collection Quality Assurance Plan. All sampling locations shall be documented in a log and identified on a detailed site map.

A. Environmental Setting

The Respondent shall collect information to supplement and verify existing information on the environmental setting at the facility or site. The Respondent shall characterize the following:

1. Regional Hydrogeology

The Respondent shall conduct a program to evaluate the regional hydrogeologic characteristics in the vicinity of the facility. Regional information can be obtained as described in Task 1. This shall include but not be limited to:

a. Depth to bedrock and lithology;

b. Characteristics of major stratigraphic units and the depositional environment;

c. Identification of regional aquifer(s);

d. Average yield of water wells within a one mile radius of the site or facility;

e. Direction of ground water flow in the regional aquifer(s);

f. Identification and characterization of recharge and discharge areas, with amount of recharge and discharge;

g. Description of regional geomorphology,

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including locations of surface water bodies and floodways, etc. This description should include an analysis of any topographic features that may influence the ground water flow system; and

h. Description of structural features such as jointing, faulting and folding.

2. Site Hydrogeology

The Respondent shall conduct a program to evaluate site-specific hydrogeologic conditions at the site or facility. This description shall be based on data collected from bore holes, piezometers and field tests. The description shall include:

a. An accurate classification and description of the consolidated and unconsolidated stratigraphic units from the ground surface down to the base of the uppermost aquifer. This shall include:

i) Hydraulic conductivity (vertical and horizontal);

ii) Porosity and bulk density;

iii) Rock and soil (Unified Soil Classification System) types;

iv) Grain size distribution (sieve and hydrometer) curves;

v) Thickness;

vi) Lateral extent;

vii) Moisture content;

viii) The attenuation capacity and mechanisms of the natural earth materials (i.e., ion exchange capacity, organic carbon content, mineral content, soil sorptive capacity, storage capacity).

ix) Soil pH.

b. Respondent shall conduct a program to characterize the soil and rock units above the water table in the vicinity of the

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contaminant release(s). Such characterization shall include but not be limited to the following:

i) SCS soil classification;

ii) Surface soil distribution;

iii) Soil profile, including ASTM classification of soils;

iv) Transects of soil stratigraphy;

v) Effect of stratification on unsaturated flow;

vi) Infiltration; and

vii) Evapotranspiration.

c. A description of the geomorphology at the site or facility;

d. A description of the structural geology at the site or facility;

e. A discussion of the local occurrence of ground water including:

i) Identification of the uppermost aquifer system, including its depth from the surface and lateral and vertical extent. (Aquifer system means one or more geologic unit or formation that is wholly or partly saturated with water and is able to store, transmit and yield significant amounts of water to wells or springs.)

ii) Identification of all significant saturated zones above the uppermost aquifer system;

iii) Depth to the water table;

iv) Vertical and horizontal hydraulic conductivity of the uppermost and all strata above the uppermost aquifer;

v) Ground water flow direction and rates in the uppermost aquifer and all strata above the uppermost aquifer;

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vi) Description of the interconnection between the saturated zones and the uppermost aquifer, surface water, seeps and springs;

vii) Description of recharge and discharge areas within the site or facility boundaries. This shall include any relationship between ground water and springs, streams and other surface water features;

viii) Temporal fluctuations (i.e., seasonal and man-made) in ground water levels and their effects on ground water flow direction; and

ix) Identification of zones of high permeability that may act as a migration route for contaminants.

f. Hydrogeologic cross sections showing the extent (depth, thickness and lateral extent) of hydrogeologic units shall be developed. At a minimum, the following shall be identified:

i) Sand and gravel deposits in the unconsolidated deposits;

ii) Zones of fracturing or channeling in the consolidated or unconsolidated deposits;

iii) Zones of higher permeability that might direct the flow of contaminants;

iv) Zones of low permeability that may restrict and/or attenuate the flow of contaminants;

v) Water-bearing zones above the first confining layer that may serve as pathways for contaminant migration including perched zones of saturation.

g. Based on data obtained from ground water monitoring wells and piezometers installed upgradient and downgradient of the poten-

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tial contaminant source, a representative description of water level or fluid pressure monitoring including:

i) Water level contour and/or potentiometric surface maps;

ii) Hydraulic cross sections showing vertical gradients;

iii) Flow nets, including the vertical and horizontal components of flow and the interconnection between water-bearing strata; and

iv) Any temporal changes in hydraulic gradients and flow directions due, for example, to seasonal or man-made influences.

h. A description of man-made influences that may affect the hydrogeology of the site, identifying:

i) Active and inactive water supply and production wells with appropriate pumping schedules; and

ii) Man-made structures such as pipelines, french drains, ditches, unlined and lined ponds, lagoons, septic tanks, NPDES permitted outfalls, retention areas and utility lines.

i. The report shall document the methods and procedures used to gather the hydrogeologic data. This may include but is not limited to:

i) The drilling and soil sampling methods used in characterizing the soil and hydrogeologic characteristics of the site or facility (including all boring logs and raw data);

ii) The analytical procedures and methods used to characterize the soil and rock materials obtained from the borings and/or test pits;

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iii) The methods, equipment and procedures used to define the uppermost aquifer system and all significant zones of saturation above the uppermost aquifer system including:

1) Well and piezometer location, depth, construction and installation specifications (including diagrams);

2) Water level measurements and procedures;

3) Ground water seepage observations during drilling; and

4) Pumping tests and slug tests (including type, description and rational for its use, raw data and method of interpreting the results).

iv) A description, rationale and raw data of indirect methods such as soil survey, geophysical and modeling. (These methods can be used to infer ground water characteristics and support or guide direct methods. However, no site remedial investigation can be based strictly on these methods.)

3. Surface Water and Sediment

The Respondent shall conduct a program to characterize the surface water bodies in the vicinity of the facility or site. Such characterization shall include, but not be limited to, the following activities and information:

a. Description of the temporal and permanent surface water bodies including:

i) For lakes and estuaries: location, elevation, surface area, inflow, outflow, depth, temperature stratification and volume;

ii) For impoundments: location, elevation, surface area, depth, volume, freeboard and purpose of impoundment;

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iii) For streams, ditches, drains, swamps and channels: location, elevation, flow, velocity, depth, width, seasonal fluctuations and flooding tendencies (i.e., 100 year event);

iv) A qualitative review of aquatic species that may represent a route of contaminant migration leading to potential exposures;

v) Drainage patterns; and

vi) Evapotranspiration.

b. Description of the chemistry of the natural surface water and sediments. This includes determining the pH, total dissolved solids, total suspended solids, biological oxygen demand, alkalinity, conductivity, dissolved oxygen profiles, nutrients, chemical oxygen demand, total organic carbon, specific contaminant concentrations, etc.

c. Description of sediment characteristics including:

i) Deposition area;

ii) Thickness profile; and

iii) Physical and chemical parameters (e.g., grain size, density, organic carbon content, ion exchange capacity, pH, etc.)

4. Air

The Respondent shall provide information characterizing the climate in the vicinity of the site or facility. Such information shall include, but not be limited to:

a. A description of the following parameters:

i) Annual and monthly rainfall averages;

ii) Monthly temperature averages and extremes;

iii) Wind speed and direction;

iv) Relative humidity/dew point;

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v) Atmospheric pressure;

vi) Evaporation data;

vii) Development of inversions; and

viii) Climate extremes that have been known to occur in the vicinity of the facility, including frequency of occurrence.

b. A description of topographic and manmade features which affect air flow and emission patterns, including:

i) Ridges, hills or mountain areas;

ii) Canyons or valleys;

iii) Surface water bodies (e.g. rivers, lakes, bays, etc.);

iv) Wind breaks and forests; and

v) Buildings.

B. Source Characterization

The Respondent shall collect analytical data to completely characterize the wastes and the areas where wastes have been placed, collected or removed including: type; quantity; physical form; disposition (containment or nature of deposits); and facility or site characteristics affecting release (e.g., site or facility security and engineering barriers). This shall include quantification of the following specific characteristics, at each source area:

1. Unit/Disposal Area characteristics:

a. Location of unit/disposal area;
b. Type of unit/disposal area;
c. Design features;
d. Operating practices (past and present);
e. Period of operation;
f. Age of unit/disposal area;
g. General physical conditions; and
h. Method used to close the unit/disposal area.

2. Waste Characteristics:

a. Type of waste placed in the unit;

i) Hazardous classification (e.g., flam-

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mable, reactive, corrosive, oxidizing or reducing agent);

ii) Quantity; and

iii) Chemical composition.

b. Physical and chemical characteristics;

i) Physical form (solid, liquid, gas);

ii) Physical description (e.g., powder, oily sludge);

iii) Temperature;

iv) pH;

v) General chemical class (e.g., acid, base, solvent);

vi) Molecular weight;

vii) Density;

viii) Boiling point;

ix) Viscosity;

x) Solubility in water;

xi) Cohesiveness of the wastes;

xii) Vapor pressure; and

xiii) Flash point.

c. Migration and dispersal characteristics of the waste;

i) Sorption;

ii) Biodegradability, bioconcentration, biotransformation;

iii) Photodegradation rates;

iv) Hydrolysis rates; and

v) Chemical transformations.

The Respondent shall document the procedures used in making

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the above determinations.

C. Contamination Characterization

The respondent shall collect analytical data on ground water, soils, surface water, sediment and subsurface gas contamination in the vicinity of the site or facility. This data shall be sufficient to define the extent, origin, direction and rate of movement of contaminant plumes. Data shall include the location of sampling, media sampled, concentrations found and conditions during sampling, and the identity of the individuals performing the sampling and analysis. The Respondent shall address the following types of contamination at the site or facility:

1. Ground Water Contamination

The Respondent shall conduct a ground water investigation to characterize any plumes of contamination at the site or facility. The investigation shall include a description and quantification of ground water quality in the uppermost aquifer and all significant zones of saturation or permeable zones that may act as pathways for contaminant migration. This investigation shall at a minimum provide the following information:

a. A description of the horizontal and vertical extent of any immiscible or dissolved plume(s) originating from the site or facility;

b. The horizontal and vertical direction of contamination movement;

c. The velocity of contaminant movement;

d. The horizontal and vertical concentration profiles of Appendix VIII constituents in the plume(s);

e. An evaluation of factors influencing the plume movement; and

f. An extrapolation of future contaminant movement.

The Respondent shall document the procedures used in making the above determinations (e.g., well design, well construction, geophysics, modeling, etc.).

2. Soil Contamination

The Respondent shall conduct an investigation to characterize the contamination of the soil and rock units

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in the vicinity of the contaminant release. The investigation shall include the following information:

a. A description of the vertical and horizontal extent of contamination.

b. A description of contaminant and soil chemical properties within the contaminant source area and plume. This includes contaminant solubility, speciation, adsorption, leachability, exchange capacity, biodegradability, hydrolysis, photolysis, oxidation and other factors that might affect contamination migration and transformation.

c. Specific contaminant concentrations.

d. The velocity and direction of contaminant movement.

e. An extrapolation of future contaminant movement.

The Respondent shall document the procedures used in making the above determinations.

3. Surface Water and Sediment Contamination

The Respondent shall conduct a surface water investigation to characterize contamination in surface water bodies resulting from contaminant releases at the site or facility. The investigation shall include, but not be limited to, the following information:

a. A description of the horizontal and vertical extent of any immiscible or dissolved plume(s) originating from the facility or site, and the extent of contamination in underlying sediments;

b. The horizontal and vertical direction of contaminant movement;

c. The contaminant velocity;

d. An evaluation of the physical, biological and chemical factors influencing contaminant movement;

e. An extrapolation of future contaminant movement; and

f. A description of the chemistry of the contaminated surface waters and sediments. This

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includes determining the pH, total dissolved solids, specific contaminant concentrations, etc.

g. Respondent shall document the procedures used in making the above determinations.

4. Air Contamination

The Respondent shall conduct an investigation to characterize the particulate and gaseous contaminants released into the atmosphere. The investigation shall provide the following information:

a. A description of the horizontal and vertical direction and velocity of contaminant movement;

b. The rate and amount of the release; and

c. The chemical and physical composition of the contaminant(s) released, including vertical and horizontal concentration profiles.

The Respondent shall document the procedures used in making the above determinations.

5. Subsurface Gas Contamination

The Respondent shall conduct an investigation to characterize subsurface gases emitted from buried hazardous waste and hazardous constituents in the ground water. This investigation shall include the following information:

a. A description of the horizontal and vertical extent of subsurface gases migration;

b. The chemical composition of the gases being emitted;

c. The rate, amount, and density of the gases being emitted; and

d. Horizontal and vertical concentration profiles of the subsurface gases emitted.

The Respondent shall document the procedures used in making the above determinations.

D. Potential Receptors

The Respondent shall collect data describing the human populations and environmental systems that are susceptible to

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contaminant exposure from the facility. Chemical analysis of biological samples may be needed. Data on observable effects in ecosystems may also be obtained. The following characteristics shall be identified:

1. Local uses and possible future uses of ground water:

   a. Type of use (e.g., drinking water source: municipal or residential, agricultural, domestic/non-potable and industrial); and

   b. Location of ground water users including wells and discharge areas.

2. Local uses and possible future uses of surface waters draining the facility:

   a. Domestic and municipal (e.g., potable and lawn/garden watering);

   b. Recreational (e.g., swimming, fishing);

   c. Agricultural;

   d. Industrial; and

   e. Environmental (e.g., fish and wildlife propagation).

3. Human use of or access to the site or facility and adjacent lands, including but not limited to:

   a. Recreational;

   b. Hunting;

   c. Residential;

   d. Commercial;

   e. Zoning; and

   f. Relationship between population locations and prevailing wind direction.

4. A description of the biota in surface water bodies on, adjacent to, or affected by the site or facility.

5. A description of the ecology overlying and adjacent to the facility.

6. A demographic profile of the people who use or who have

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access to the facility and adjacent land including, but not limited to age, sex and sensitive subgroups.

7. A description of any endangered or threatened species near the site or facility.

TASK 5 -- SITE INVESTIGATION ANALYSIS

The Respondent shall prepare a thorough analysis and summary of all site or facility investigations and their results. The objective of this task will be to ensure that the investigation data are sufficient in quality (e.g, quality assurance procedures have been followed) and quantity to adequately describe the nature and extent of contamination, potential threat to human health and/or the environment and to support the feasibility study.

The results and data from all site investigations shall be organized and presented logically so that the relationships between remedial investigations for each media are apparent.

A. Data Analysis. The Respondent shall analyze all site or facility investigation data and develop a report of the type and extent of contamination at the site or facility. This analysis shall include all significant sources, pathways of contamination and a risk assessment. The risk assessment shall describe any actual or potential threats to public health, welfare and the environment. The report shall describe the extent of contamination (qualitative/ quantitative) in relation to background areas indicative for the area.

B. Risk Assessment. The Respondent shall prepare a risk assessment which shall contain a discussion of and present the data required in the tasks outlined below:

1. Selection of Indicator Chemicals. Respondent shall:

   a. Develop an initial list of chemicals based on chemical toxicity information, site concentration data, environmental mobility and background concentration data.

   b. Develop indicator scores using chemical concentrations and toxicity constants.

   c. Develop a final indicator chemicals list.

2. Estimate of Exposure Point Concentrations of Indicator Chemicals. Respondent shall:

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a. Combine site monitoring data and environmental modeling results to:

i. identify exposure pathways

ii. estimate exposure point concentrations, and

iii. compare these concentrations to requirements, standards and criteria.

3. Estimate of Chemical Intakes. Respondent shall:

a. Provide estimates of chemical intakes from:

i. Air

ii. Ground water

iii. Surface water

iv. Other exposure pathways (soils, foodstuffs, recreation, etc.)

b. Combine pathway-specific intakes to yield total oral and total inhalation routes.

4. Respondent shall evaluate critical toxicity values (i.e., numerical values describing a chemical toxicity) and review general toxicological information for the indicator chemicals.

5. Risk Characterization. Respondent shall provide a detailed characterization of the risk posed by releases of toxic chemicals from the site. The characterization shall include the following elements:

a. Noncarcinogenic effects using the Hazard Index approach, where

$$HI = E(1)/RL(1) + E(2)/RL(2) + \ldots E(i)/RL(i)$$

E(i) = Exposure level (or intake) for the (i)th toxicant

RL(i) = Reference level (or intake) for the (i)th toxicant

b. Potential carcinogenic effects using the predicted risk approach, where

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Risk = CDI x Carcinogenic Potency Factor

CDI = Chronic Daily Intake

It is assumed that risks are additive and there is independence of action by the compounds involved. Therefore, the following equations are used:

Carcinogenic risk for chemical X = [CDI (inhalation) x PF (inhalation)] + [CDI (oral) x PF (oral)]

Total carcinogenic risk = (carcinogenic risk for chemical 1 + carcinogenic risk for chemical 2 + ... + carcinogenic risk for chemical (i))

c. Uncertainties. Respondent shall provide a discussion of the uncertainties and assumptions made in the assessment process.

C. Protection Standards [Applicable to RCRA Corrective Actions]

1. Ground Water Protection Standards

For regulated units the Respondent shall provide information for OEPA's selection/development of Ground Water Protection Standards for all of the Appendix VIII constituents found in the ground water during the Remedial Investigation (Task IV).

a. The Ground Water Protection Standards shall consist of:

i) for any constituents listed in Table 1 of 40 CFR 264.94, respective value given in that table (MCL) if the background level of the constituent is below the value given in Table 1; or

ii) the background level of that constituent in the ground water; or

iii) an OEPA approved Alternative Concentration Limit (ACL).

b. Information to support OEPA's subsequent selection of Alternate Concentration Limits

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(ACLs) shall be developed by the Respondent in accordance with U.S. EPA guidance. For any proposed ACLs the Respondent shall include a justification based upon the criteria set forth in 40 CFR 264.94(b) (check Ohio cite).

c. Within [insert number] days of receipt of any proposed ACLs, OEPA shall notify the Respondent in writing of approval, disapproval or modifications and specify in writing the reason(s) for any disapproval or modification.

d. Within [insert number] days of receipt of OEPA's notification of disapproval of any proposed ACL, the Respondent shall amend and submit revisions to OEPA.

2. Other Relevant Protection Standards

The Respondent shall identify all relevant and applicable standards for the protection of human health and the environment (e.g. National Ambient Air Quality Standards, Ohio water quality standards, etc.).

TASK 6 -- LABORATORY STUDIES AND BENCH-SCALE STUDIES (Optional)

Respondent shall conduct any necessary laboratory and bench scale treatability studies required to determine the applicability of remedial technologies, e.g., leachate treatment, groundwater treatment, compatibility of waste/leachate with liners, cover or other materials proposed for use in the remedy. The Respondent shall analyze the technologies based on literature review, vendor contracts and past experience to determine the testing requirements.

The Respondent shall develop a testing work plan identifying the type(s) and goal(s) of the study(ies), the level of effort needed and the procedures to be used for data management, validation and interpretation.

Upon completion of the testing, the Respondent shall evaluate the testing results to assess the technology or technologies with respect to the site-specific questions identified in the test work plan.

The Respondent shall prepare a report summarizing the testing program and its results, both positive and negative.

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TASK 7 -- REPORTS

A. Preliminary and Workplan

The Respondent shall submit to OEPA reports on Tasks 1 and 2 when it submits the Remedial Investigation Workplan (Task 3).

B. Progress

Monthly Technical Progress Reports are required of the Respondent. For each on-going work assignment, respondent shall submit progress reports with the following elements:

1. Identification of site and activity.

2. Status of work at the site and progress to date.

3. Percentage of completion.

4. Data generated to date

5. Difficulties encountered during the reporting period.

6. Actions being taken to rectify problems.

7. Activities planned for the next month.

8. Changes in personnel.

The monthly progress report will list target and actual completion dates for each activity including project completion and provide an explanation of any deviation from the milestones in the work plan schedule.

C. Draft and Final

Upon OEPA approval, the Respondent shall prepare a Remedial Investigation Report to present Tasks 4 and 5. The Remedial Investigation Report shall be developed in draft form for OEPA review. The Remedial Investigation Report shall be developed in final format incorporating comments received on the draft Remedial Investigation Report. Task 6 shall be submitted as a separate report when the final Remedial Investigation Report is submitted.

[number] copies of all reports, including the Task 1 report, Task 2 report, Task 3 workplan, Task 6 report and both the Draft and Final Remedial Investigation Reports (Tasks 4 and 5) shall be provided by the Respondent to OEPA. Two copies of each report shall be provided to the appropriate OEPA District Office and one copy each to the OEPA Central Office.

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[THE FOLLOWING SITE OR FACILITY SUBMISSION SUMMARY MAY BE PLACED IN THE BODY OF THE ORDER OR PERMIT AND REMOVED FROM THE SCOPE OF WORK. NOT ALL OF THE ITEMS LISTED BELOW MAY BE REQUIRED AT EACH FACILITY.]

Facility or Site Submission Summary

A summary of the information reporting requirements contained in the Remedial Investigation Scope of Work is presented below:

Submission	Due Date
Description of Current Situation (Task 1)	[DATE]
Pre-investigation Evaluation of Remedial Technologies (Task 2)	[DATE]
RI Workplan (Task 3)	[DATE]
Draft RI Report (Tasks 4 and 5)	[NUMBER] days after RI Workplan approval
Final RI Report (Tasks 4 and 5)	[NUMBER] days after OEPA comment on Draft RI Report
Laboratory and Bench-scale Studies (Task 6)	Concurrent with Final RI Report
Progress Reports on Tasks 1 through 6	Monthly

FEASIBILITY STUDY

PURPOSE

The purpose of this feasibility study is to develop and evaluate remedial alternatives for [specific site].

Respondent shall furnish the necessary personnel, materials and services required to prepare the remedial action feasibility study.

SCOPE

The feasibility study consists of eight tasks:

Task 8 -- Description of Current Situation

Task 9 -- Work Plan

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Task 10 -- Development of Alternatives

Task 11 -- Initial Screening of Alternatives

Task 12 -- Detailed Analysis of Alternatives

Task 13 -- Evaluation and Selection of Preferred Alternative

Task 14 -- Final Report

Task 15 -- Additional Requirements

TASK 8 -- DESCRIPTION OF CURRENT SITUATION

Any changes to the description of the current situation from Task 1 shall be presented. Justification for changes must be based on results of the remedial investigation.

A site-specific statement of purpose for the response, based on the results of the remedial investigation, should be presented. The statement of purpose should identify the actual or potential exposure pathways that should be addressed by remedial alternatives. This statement of purpose shall be submitted to the State for concurrence before continuing the remaining tasks of the Feasibility Study.

TASK 9 -- WORK PLAN

A work plan that includes a detailed technical approach, personnel requirements and schedules shall be submitted to the State for review and concurrence for the proposed feasibility study.

TASK 10 -- DEVELOPMENT OF ALTERNATIVES

Based on the results of the remedial investigation, Respondent shall develop a limited number of alternatives for source control or off-site remedial actions, or both, on the basis of objectives established for the response.

a. Establishment of Remedial Response Objectives

Establish site-specific objectives for the response based on public health and environmental concerns, information gathered during the remedial investigation, Section 300.68 of the National Contingency Plan (NCP), EPA interim guidance and the requirements of any other applicable Federal or State statutes. Preliminary cleanup objectives shall be developed in consultation with and for concurrence by the State.

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b. Based on the remedial response objectives established

above and the statement of purpose identified in Task 8, identify appropriate remedial technologies as a basis for the development of remedial alternatives. These technologies shall be identified on a media-specific basis, although consideration should be given to the interrelationship of the media. The technologies should be able to meet the response objectives. The list of potential remedial technologies developed in Task 2e and Task 4b shall be considered a master list of applicable technologies and shall be screened based on site conditions, waste characteristics and technical requirements to eliminate or modify those technologies that may prove extremely difficult to implement, will require unreasonable time periods to implement, or will rely on insufficiently developed technology.

c. Identification of Remedial Alternatives

Develop alternatives to incorporate remedial technologies, response objectives and other appropriate considerations into a comprehensive, site-specific approach. Alternatives developed should include the following:

1) Alternatives for off-site treatment or disposal;

2) Alternatives which attain applicable and/or relevant Federal and State public health or environmental standards;

3) Alternatives which exceed applicable and/or relevant Federal and State public health or environmental standards;

4) No action alternative for comparison with other developed alternatives.

There may be overlap among the alternatives developed. All alternatives except the no action alternative must meet the requirements of all applicable State and Federal environmental laws including permitting requirements. Alternatives shall be developed in close consultation with the State.

TASK 11 -- INITIAL SCREENING OF ALTERNATIVES

The alternatives developed in Task 10 shall be screened by the respondent to eliminate alternatives, prior to detailed analysis, that are clearly not feasible or appropriate. All decisions made as a part of this screening of alternatives should be documented.

The following considerations shall be used as a basis for the

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initial screening:

1) Cost. An alternative that far exceeds the cost of other alternatives evaluated and that does not provide substantially greater public health or environmental benefits will usually excluded from further consideration.

2) Effects of the Alternative. Only those alternatives that effectively contribute to protection of public health, welfare and the environment will be considered further. Any alternatives that inherently present significant adverse effects will be excluded from further consideration.

3) Acceptable Engineering Practices. Alternatives that may prove to be extremely difficult to implement, will not achieve the remedial objectives in a reasonable time period or that rely on unproven technologies will be excluded from further consideration.

TASK 12 -- DETAILED ANALYSIS OF ALTERNATIVES

Respondent shall prepare a detailed analysis of the alternatives that pass through the initial screening in Task 11.

The detailed analysis shall consist of the following elements:

a. Detailed Description

The detailed description of each remaining alternative shall include as a minimum:

1) Description of appropriate treatment and disposal technologies.

2) Special engineering considerations required to implement the alternative, e.g., pilot treatment facility or additional studies needed to proceed with final remedial design.

3) Operation, maintenance and monitoring requirements of the completed remedy.

4) Off-site disposal needs and transportation plans.

5) Temporary storage requirements.

6) Safety requirements for remedial implementation, including both on-site and off-site health and safety considerations.

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7) An analysis of how the alternatives could be phased into individual operations and a discussion of how these operations could best be implemented (individually or in groups) to produce significant environmental improvement.

8) A review of any off-site treatment or disposal facilities to ensure compliance with RCRA, TSCA and State requirements, both current and proposed.

9) An analysis of the projected performance and expected results of the alternative with emphasis on potential for further future release of hazardous substances.

b. Environmental Assessment

An Environmental Assessment (EA) shall be performed for each alternative including, as a minimum, an evaluation of each alternative's environmental effects, an analysis of measures to mitigate adverse effects, physical or legal constraints and compliance with Federal and State regulatory requirements.

Each alternative will be assessed in terms of the extent to which it will mitigate damage to or protect public health, welfare and the environment, in comparison to the other remedial alternatives.

The no action alternative will be fully evaluated to describe the current site conditions and anticipate environmental conditions if no actions are taken. The no action alternative will serve as a baseline for the Environmental Assessment.

c. Cost Analysis

The present worth of implementing each remedial alternative (and each phase of the alternative) as well as the annual operation and maintenance cost shall be presented. The cost shall be provided as a total cost and on an annual cost basis.

TASK 13 -- EVALUATION AND SELECTION OF COST-EFFECTIVE ALTERNATIVE

The State shall review the results of the detailed analysis of alternatives prepared under Task 12 and select the cost-effective alternative. The lowest cost alternative that is technologically feasible and reliable and which effectively mitigates and minimizes damage to and provides adequate protection of public health, welfare or the environment will be considered the

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preferred alternative.

The following considerations shall be used as a basis for selecting the preferred alternative:

1) Overall Protection of Human Health and the Environment. Alternatives shall be assessed as to whether they can adequately protect human health and the environment from unacceptable risks posed by hazardous substances, pollutants or contaminants present at the site by eliminating, reducing or controlling exposures to levels established during development of remediation goals. This is a threshold requirement and the primary objective of the remediation program.

2) Compliance with Legal Requirements. The alternatives shall be assessed as to whether they attain applicable legal requirements of other State and Federal laws.

3) Long-term Effectiveness and Permanence. Alternatives shall be assessed for the long-term effectiveness and permanence they afford, along with the degree of certainty that the alternative will prove successful. Factors that shall be considered, as appropriate, include the following:

   a) Nature and magnitude of total residual risks in terms of amounts; potential for exposure of human and environmental receptors; concentrations of hazardous substances, pollutants or contaminants remaining following implementation of remedial alternative, considering the persistence, toxicity, mobility and propensity to bioaccumulate of such hazardous substances and their constituents;

   b) The type, degree and adequacy of long-term management required for untreated substances and treatment residuals, including engineering controls (such as containment technologies), institutional controls, monitoring and operation and maintenance;

   c) Long-term reliability of the engineering and institutional controls, including uncertainties associated with land disposal of untreated hazardous substances, pollutants and contaminants, as well as treatment residuals, and;

   d) Potential need for replacement of the remedy, as well as the continuing need for repairs to maintain the performance of the remedy.

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4) Reduction of Toxicity, Mobility or Volume. The degree to which alternatives employ treatment that reduces toxicity, mobility or volume of contaminants shall be assessed. Alternatives which, at a minimum, address the principal threats posed by the site through treatment shall also be identified. Factors that shall be considered, as appropriate, include the following:

a) The treatment processes the alternatives employ and materials they will treat;

b) The amount of hazardous substances, pollutants or contaminants that will be destroyed or treated;

c) The degree of expected reduction in toxicity, mobility or volume, including how the principal threat is addressed through treatment;

d) The degree to which the treatment is irreversible; and

e) The residuals that will remain following treatment, considering the persistence, toxicity, mobility and propensity to bioaccumulate of such hazardous substances and their constituents.

5) Short-term Effectiveness. The short-term impacts of the alternatives shall be assessed considering the following:

a) Short-term risks that might be posed to the community during implementation of an alternative;

b) Potential impacts on workers during remedial action and the effectiveness and reliability of protective measures;

c) Potential environmental impacts of the remedial action and the effectiveness and reliability of mitigative measures during implementation; and

d) Time until protection is achieved.

6) Implementability. The ease or difficulty of implementing the alternatives shall be assessed by considering the following types of factors, as appropriate:

a) Degree of difficulty or uncertainty associated with construction and operation of the technol-

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ogy;

b) Expected operational reliability of technologies the alternatives utilize and the ability to undertake additional action, if required;

c) Ability and time required to obtain the necessary approvals and permits from agencies;

d) Availability of necessary equipment and specialists;

e) Available capacity and location of needed treatment, storage and disposal services; and

f) Timing of the availability of prospective technologies that may be under consideration.

7) Cost. The types of costs that shall be assessed include the following:

a) Capital costs, including contingency and engineering fees;

b) Operation and maintenance costs; and

c) Net present value of capital and O&M costs.

8) Community Acceptance. This assessment includes determining which components of the alternatives interested persons in the community support, have reservations about, or oppose. This assessment may not be completed until comments on the proposed remedy are received.

TASK 14 -- FINAL REPORT

A final report shall be prepared for submission to the State, including the results of Task 8 through Task 13. Copies of the report shall be submitted to the State.

TASK 15 -- ADDITIONAL REQUIREMENTS

Monthly Technical Progress Reports are required of Respondent. These documents are described in Task 7 of the remedial investigation scope of work.

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